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Guide to the Lichens of the New York Area

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Based on what they look like. Botanists may continue for a long time debating what lichens are, but their appearance is not subject to debate, and is therefore a good, practical basis for identification.

Group 1. Stalked Lichens, much of which are not supported on the stalks, but spread around their base, as either a crust or a mat of leaf-like flakes, from which the stalks spring. (Mostly Cladoniae, to which Torreyia has already published a key.)

Group 2. Stalked Lichens growing on the ground as bushy tufts, with all of the lichen that is plainly visible supported on the stalks. (Mostly Cladoniae, to which Torreyia has already published a key.)

Group 3. Stalked Lichens altogether supported on the stalks, growing nearly always on trees or wood, as upright, bushy, or hanging, beard-like tufts.

THE USNEAS

When Longfellow wrote of "the murmuring pines and the hemlocks bearded with moss," the moss he referred to was largely not moss in the botanical sense, but lichens of different species, including *Usnea*, *Alectoria*, *Ramalia*. Not only in the north woods, but in our own mountains, in our bogs and coastal swamps, we find *Usnea* here and there on the trunks and branches of trees, sometimes high up, but usually not above the limits of frequent fog. While many species have been named, these do not divide sharply, and it is convenient for the average botanist to recognize only certain distinct types by name, leaving less well marked forms to the specialist.

Usnea florida (L.). FLOWERING LICHEN

The tufts of *Usnea florida*, in contrast to most of the *Usneas*

(which droop) stand out stiffly, and more or less upright from the bark on which they grow. Stalks are usually 4 or 5 cm. high, but may reach two or three times that size.

The general color is greenish gray (ashy gray in dry weather), often blackening along the stalks or occasionally stained reddish in places. The main stalk, frequently 2 mm. or more in thickness, is rounded, sometimes cracked in rings, showing a white core within, due probably to being pulled by climbing animals, or by ice. Its surface is beset with tiny warts visible under the hand lens, and with profuse branches, branchlets and fibrils, most of which stand out nearly at right angles to the stalk from which they spring. Various parts may or may not be dotted with dusty white specks known as soredia.

The fruit, a thin disk up to 1 cm. or more in diameter, flesh-colored, buff, pale greenish or pinkish, its irregular rim usually fringed with rather long fibrils, does indeed suggest a flower. *Usnea florida* will be found without fruit more often than with.

When very small, compact, and intricately branched, it may be called *Usnea hirta* (L.). These two are the only erect *Usneas*, all other forms drooping downward.

Usnea barbata (L). BEARDED LICHEN

Hanging downward like a beard, slender, flexible, blowing in the wind, of any length up to a meter or two, typical *Usnea barbata* is easily distinguished from typical stiff, erect *U. florida*. It is less densely branched as a rule, and the smaller fruits, rarely seen, occur along the branches rather than at their tips, otherwise much like *U. florida*. If you call all drooping forms *Usnea barbata*, you will not be far wrong, for the other species are often considered mere varieties of it.

Usnea plicata (L.) is coarser than *U. barbata*, with larger fruits, and in fact looks more like *U. florida* except that it is flexible, hangs downward, and fruits along the branches. *U. longissima* Ach. has scales instead of warts, and fruits at the tips, though fruits, as in *U. barbata*, are rare. *U. angulata*, also without warts, has somewhat angled stems, and though drooping like *U. barbata*, is rigid like *U. florida*. *U. cavernosa* Tuck. differs from *U. barbata* in having the stem conspicuously pitted near the base. It is interesting to observe these minor variations,

and those who wish may call the above-described forms by their names as separate species.

Usnea trichodea Ach. HAIR LICHEN

Differs from all other *Usneas* in its extreme slenderness, the main stalk often only 0.2 mm. thick, and tapering to hair-like tips. Not so common as the others northward, it is fairly abundant in the pine barrens. Typically very pale green or soft greenish gray. The fruits, usually along the stem, but rare, average smaller, not over 4 mm. diameter, round and smooth, of the same color as the stems, and with few or no fibrils on the rim. The fibrils of the branches also may be widely scattered. Though distinct in its slenderness, *U. trichodea* has forms which approach *U. barbata*, and may be called by either name.

Spores of the different species of *Usnea* do not differ materially from each other. All are ellipsoid, colorless, undivided, about 6 to 10 by 4 to 8 microns, and come 8 in each sack. They may usefully be studied under the compound microscope to distinguish *Usnea* from possible confusion with *Ramalina* and *Teloschistes*, which have 2-celled spores.

The conspicuous character by which *Usnea* may be distinguished from other lichens in Group 3, is the presence of fibrils and branchlets standing at right angles to the stalks and branches, and fringing the fruit-rims. *Ramalina* and *Evernia* (Group 4), beside lacking the *Usnea* fibrils, have their stalks variously flattened, angled and channeled.

Alectoria, the only other lichen easily confused with *Usnea*, usually turns brown in contrast to *Usnea*'s greenish gray, and through *Alectoria* bears fibrils, these do not usually occur along the main branches. While the surface of *Usnea* tends to be dull, that of *Alectoria* becomes polished and shining. In the New York area, *Alectoria* is usually more slender than any *Usnea* except *U. trichodea*. For a decisive test, however, pull a stalk until it breaks. *Usnea* is constructed like a telephone wire, with a tough, hard, pure white core, surrounded by more brittle "insulation," *Alectoria* more like a garden hose, either hollow, or partly stuffed with weak threads.

Along the southern coast, beginners may confuse the hanging *Usneas* with the so-called moss which everywhere droops from the trees, but which is neither a moss nor a lichen. It is

Tillandsia usneoides (also known by various other scientific names) and bears small, yellowish flowers. It has narrow leaves along the stem.

Alectoria jubata (L.). BROWN MANE LICHEN

Hanging downward from the bark of trees in bogs and swamps, or on mountain tops, will be found occasional tufts of the BROWN MANE, consisting of tangled and branching hairs somewhat like *Usnea*. In the New York area, the stalks remain slender, rarely more than 0.3 mm. in diameter, and usually not more than 10 or 15 cm. long. Under a lens the surface is seen to be smooth and shining, usually browned or blackened, as though scorched by fire. This color will distinguish it from *Usnea*, as will also the hollow stalk, lacking *Usnea*'s tough core. Farther north, *Alectoria* becomes larger and more robust.

Fruits, rare in the New York area, are chestnut brown, up to 3 mm. in diameter, with an inconspicuous rim and no fibrils. Spores much like those of *Usnea*, one-celled, colorless, 6 to 9 by 4 to 6 microns.

Alectoria chalybeiformis (L.) is only a subspecies of *A. jubata*, usually tufted instead of hanging, and sometimes growing on mossy rocks as well as trees. It is often covered with white specks which under the lens show as rounded patches of soredia. These are rare on *A. jubata*. It does not fruit.

Alectoria sarmentosa Ach., STRINGY LICHEN, rare south of northern New England, is straw-colored or greenish instead of the characteristic brown of *A. jubata*, and has fruits up to 7 mm. in diameter, with brown spores 20 to 48 by 12 to 24 microns. These very large, dark spores easily distinguish it from any other hanging lichen.

Alectorias are well marked and distinct from other lichens. Their round stalks separate them from most *Ramalina*, *Evernia* and *Teloschistes* species, the hollow structure, and the usually browned and shining surface from *Usnea*. When not growing on trees, the color and the manner of branching, ending in hair-like fibrils, prevent confusion with the Reindeer Mosses of Group 2.

Teloschistes chrysophthalmus (L.) GOLD EYE LICHEN

This little tufted species, often only 1 or 2 cm. long, may stand upright or hang down like a miniature *Usnea*, and in

some of its forms could easily be mistaken for *Usnea*, in others for *Ramalina*. Its stalks are typically about 1 mm. through, irregularly angled, flattened and channeled, their tips ending in more or less lengthened fibrils or threads. Found on trees in swamps and bogs, but not often. The color varies from pale greenish or grayish to yellow, a distinct yellow form with rounded and longer branches called var. *flavicans*.

When in fruit, there is no mistaking it, for the little disks, up to 5 mm. across, are golden yellow to orange, and no similar stalked lichen in the New York area is so colored. The rim may be torn or toothed, or decorated with fibrils. The spores, 10 to 18 by 5 to 8 microns, show a peculiar polar structure, as in other lichens with an orange tint, two cells, one in each end, separated by a wide wall which occupies most of the center of the spore, and through which runs a distinct longitudinal line, a narrow tube connecting the cells. These spores are strikingly different from those of other stalked lichens.

Greenish gray forms can be confused with *Ramalina* or *Usnea* unless fruits are present. Unlike *Ramalina*, the tips often end in fibrils. Unlike *Usnea*, the stalks are usually more or less flattened. And there is usually a tinge of yellow present to distinguish it from either. So rare is this species in the north, that there is little likelihood of finding it at all.

Ramalina calicaris (L.). TWIG LICHEN •

Of all the larger stalked lichens which grow on trees, *Ramalina* is the commonest and most generally distributed. It can be looked for on the trunks, branches and twigs of trees and bushes along the seashore, in swamps and bogs inland, and on all the higher mountains. Its greenish or grayish tufts commonly range from 1 to 5 cm. or more in height and spread, and may be dense or straggling. The stalks may be nearly round, or variously flattened, angled, channeled or veined. The main stalks, typically 1 to 3 mm. across, may be found considerably wider in flattened forms. Once seen it is not easily confused with any other lichen except *Evernia prunastri* and *Teloschistes chrysophthalmus*.

In *R. calicaris* and its subspecies, the fruits are at first neatly rounded cups with a smooth rim, but later the center may swell up and cover the rim. The disk is faintly colored, usually a shade

paler than the branches, or whitish, buff or slightly flesh-color, mostly smaller than 5 mm. diameter.

The several subspecies or varieties into which *Ramalina calicaris* has been divided may be noted if desired. *R. fcrinacea* (L.) is dotted over with white specks (soredia) which are never large, as in *R. pollinaria*, while the non-inflated stalks distinguish it from *R. dilacerata*. *R. canaliculata* (E. Fries) has the stalks distinctly channeled, and the fruits apparently on the tips, but actually on the sides of branchlets which are bent backward, an arrangement not confined to this form. *R. fastigiata* (Pers.) is a similar densely tufted form with more or less rounded stalks, and fruits usually along the branches. *R. subamplicata* (Nyl.) has flattened and almost leaf-like stalks, with fruits along the surface and the margins. It suggests Group 4, but both sides of the stalk have the same structure and appearance, while in Group 4 the two sides tend to differ.

The microscope quickly distinguishes *Ramalina*, because spores have two cells with a simple dividing wall, not thickened as in *Teloschistes*. Size 9 to 18 by 4 to 7 microns, often with tapered ends and somewhat curved at times. No other stalked lichen growing on trees has spores of this kind.

A form with much longer spores, 18 to 32 by 3 to 6 microns, is distinguished as *Ramalina stenospora* Mueller, NARROW-SPORE TWIG LICHEN. It is not common, and not otherwise different from *R. calicaris*.

Ramalina fraxinea (L.), ASH TWIG LICHEN, was listed by Tuckerman as a subspecies of *R. calicaris*, and resembles *R. subamplicata*, with broad, leaf-like stalks, but the branches sometimes spraying into rounded, much divided tips. The fruits become much larger, often more than 1 cm. in diameter. These characters are so easily seen that *R. fraxinea* may usefully be called a distinct species. Its spores are like *R. calicaris*.

The smaller *Ramalina pollinaria* (Ach.), POWDERY LICHEN, usually but 1 to 2 cm. high, will sometimes be found in the crevices of cliffs, or rarely on trees. I have seen it only near Shoshola Falls, Penn., but it is reported from southern New England. Its stalks are slightly swollen, not much branched. It may be identified by the specks and relatively large, powdery patches of soredia, as much as 2 mm. across, spreading over its surface, and bursting from the tips. The soredia are much

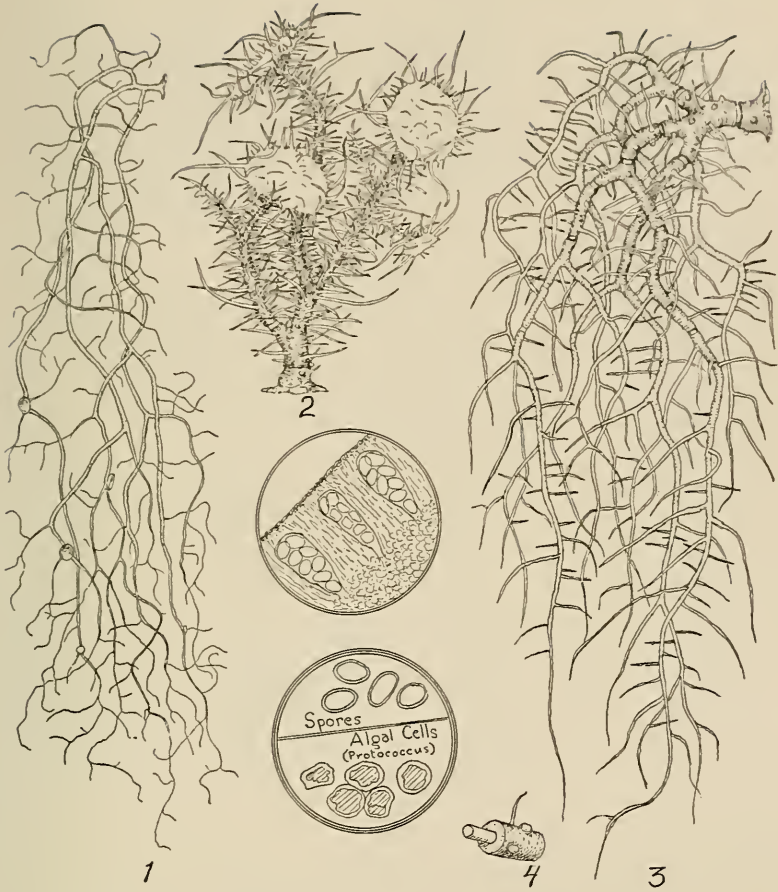


PLATE 1

Fig. 1. *Usnea trichodea* showing small fruits along the stalks.

Fig. 2. *Usnea florida* with densely bristly stalks and large fruits. Upper circle. Section of the fruit surface of *U. florida* showing spores in the spore sacks. (As seen in a hasty, thick section.) Lower circle. The same spores compared with the greenish cells of *Protococcus* always present.

Fig. 3. *Usnea barbata*.

Fig. 4. Structure of an *Usnea* stalk, showing the tough, white core surrounded by a corky outer layer.

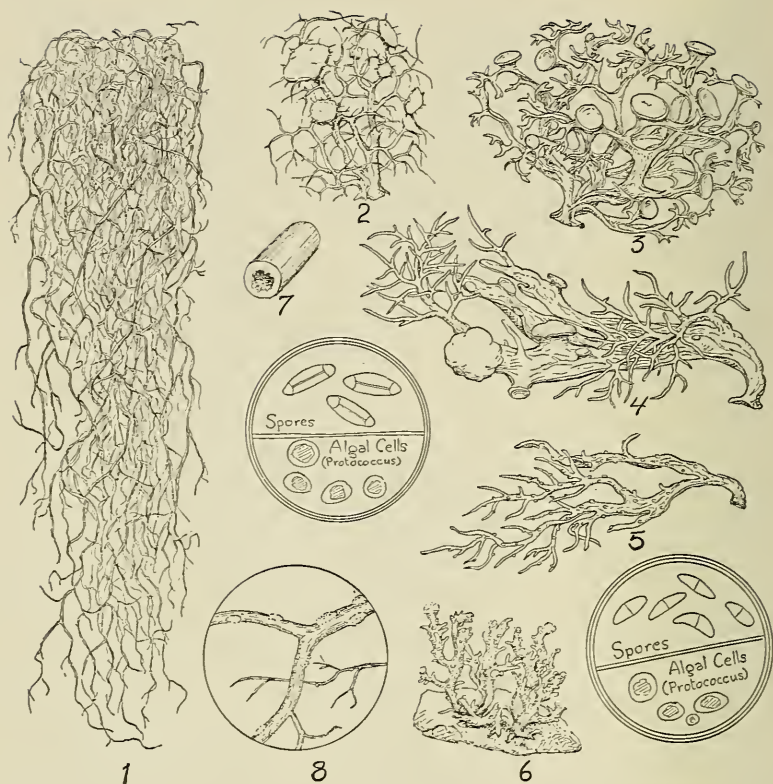


PLATE 2

- Fig. 1. *Alectoria jubata*.
 Fig. 2. *Teloschistes chrysophthalmus* with fruits (golden yellow). Upper circle. Spores of *T. chrysophthalmus* showing polar structure.
 Fig. 3. *Ramalina calicaris* with smooth, young fruits.
 Fig. 4. *Ramalina fraxinea* showing widely flattened stalks, and older, swollen fruits. (An extreme form.)
 Fig. 5. *Ramalina farinacea* showing small dots of dusty soredia.
 Fig. 6. *Ramalina pollinaria* (local form) with larger areas of soredia along the stalks and bursting from the tips. Lower circle at right spores of *R. calicaris*.
 Fig. 7. Structure of *Alectoria jubata* showing the hollow stalk.
 Fig. 8. Detail of *Alectoria chalybeiformis* showing rounded soredia.

larger than in *R. farinacea* and *R. dialacerata*, the only other local species which bear them. The European form of *R. pollinaria* looks entirely different.

In the mountains farther north, rarely in southern New York and New England, will be found *Ramalina dilacerata* (Hoffman), TORN LICHEN, a small form with swollen, hollow stalks, spraying out into rounded and tapered tips, and dotted with white specks of soredia. The small fruits are borne only on thickened tips. The inflated stalks are its chief distinguishing character.

All Ramalinas are distinguished from *Usnea* and from *Teloschistes* by their lack of hair-like fibrils, from *Usnea* and *Alectoria* by their usually flattened and angled stalks, from *Evernia* and *Cetraria* by the structure of the stalk (See Group 4) and from all similar lichens by the character of the 2-celled spores.

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(Group 4 will be similarly described in an early issue if members are interested.)